EUROPEAN SPALLATION SOURCE

# Status of the European Spallation Source ESS

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www.europeanspallationsource.se

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# Max IV and ESS

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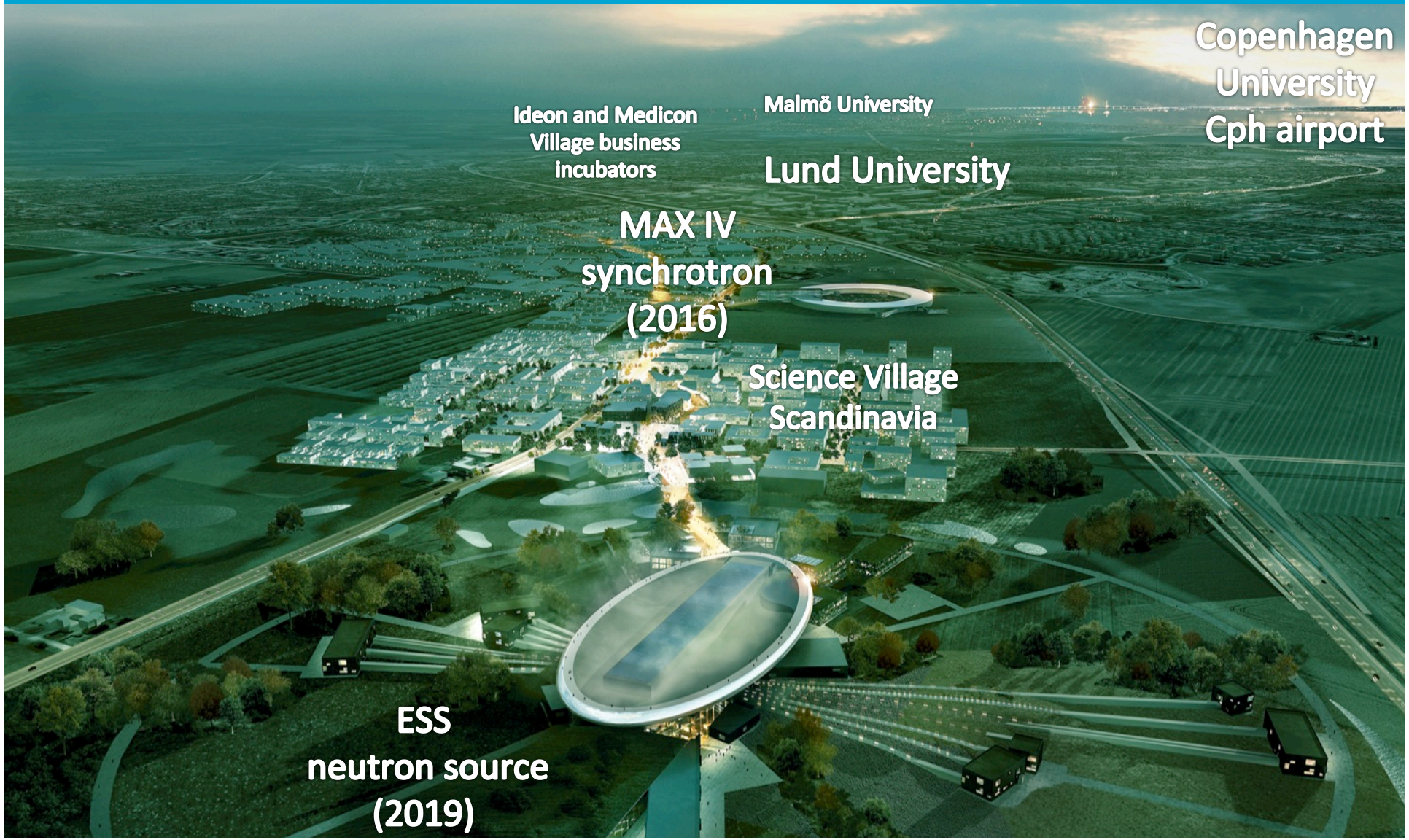
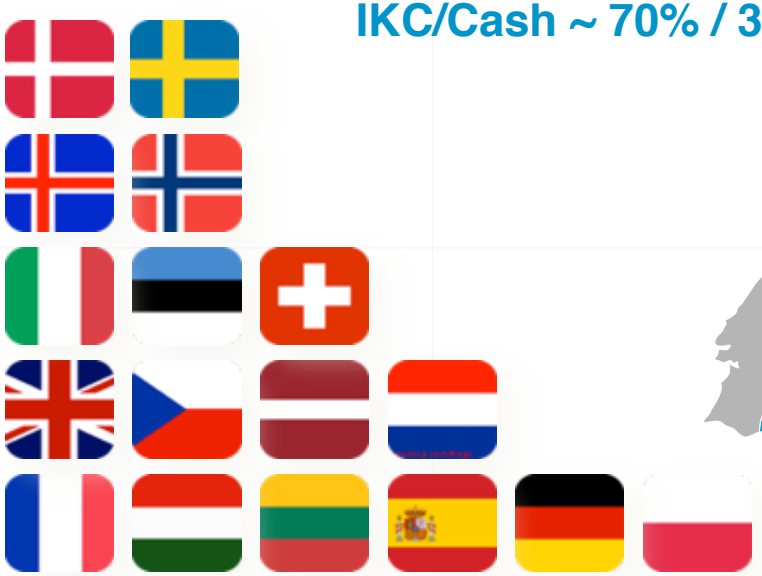


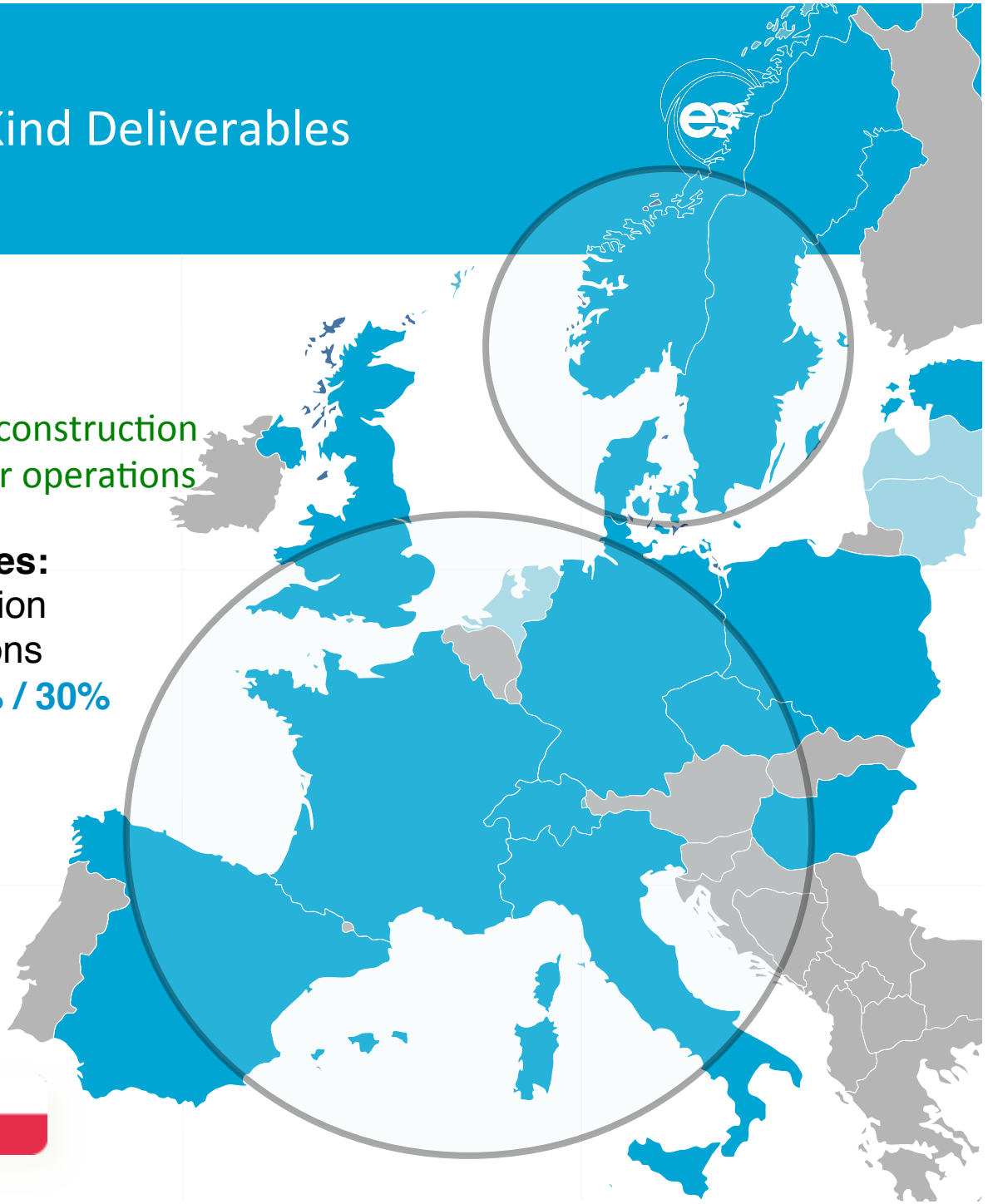
# Funding is Cash and In-Kind Deliverables

**Sweden and Denmark:**
47,5% Construction
15-20% Operations
**Cash ~100%**

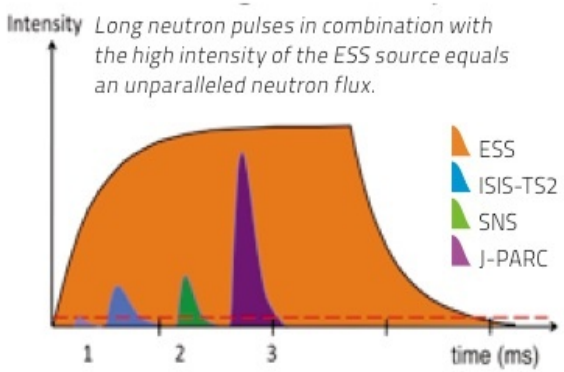
1843 M€ construction
140 M€/yr operations

**Partner Countries:**
52,5% Construction
80-85% Operations
**IKC/Cash ~ 70% / 30%**

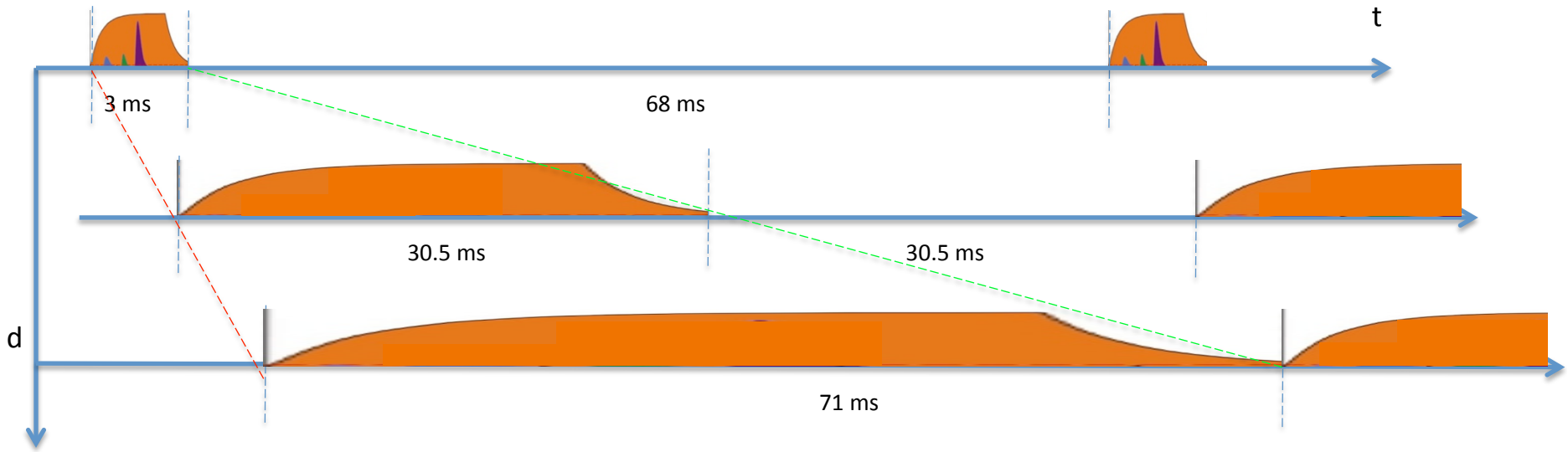




# Time Structure of the Neutron Beam




14 Hz rep rate
71.4 ms cycle time
2.86 ms pulse time
4% duty cycle
200 – 2000 m/s



# Air view March 2015

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# Inside the tunnel

# More tunnel to come

# EPICS within the ESS organization

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## Machine directorate

- Integrated Control Systems “ICS”
  - EPICS to control the whole facility

## Science directorate

- Motion Control and Automation Group “MCAG”
  - EPICS for the new motion control
- Data Management and Software Center “DMSC”
  - Located in Copenhagen
  - Scientific computing
  - Instrument control
- More EPICS users:
  - Choppers, Sample environment, Detectors
  - In kind partners

# Some EPICS decisions

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- EPICS for controls in the whole site,  from accelerator to neutron instruments
- Plan to benefit from EPICS V4: pvAccess everywhere
- CS-Studio as the generic user interface tool: control room, subsystem developers, etc.
- Databases (configuration, cable, RBAC, …)
- Probably python to control scientific instruments
- Work together with the EPICS community

# Controls hardware: Fast Realtime IO

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## Fast real time I/O

- beam diagnostics and Low Level RF
- Synchronized with the 14 Hz pulse
- > Megabyte/sec

# Controls hardware: Non real time IO

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Non real time

- E.g. Vacuum
- Reliable
- < 10 Hz, “Slow”

# Controls hardware:  real time IO

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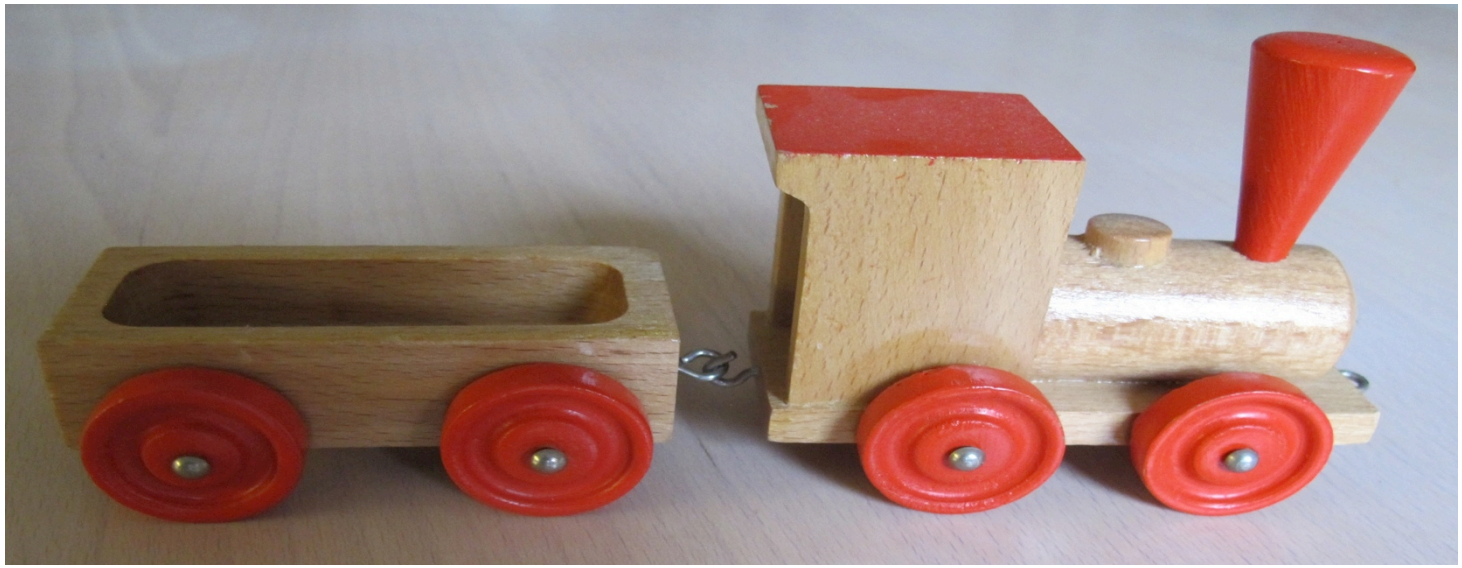
## Mid range

- Synchronized with the 14 Hz pulse
- 1 Hz .. 10 kHz, max 100 kHz
- real time



# Hardware standards, the whole spectrum

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- Fast real time I/O

  MicroTCA 4

- Mid range

  Real time industrial I/O

  EtherCAT

- Slow non real time I/O

  PLCs

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## ESS Motion Control and Automation Group (MCAG)

- select a motion control solution for the whole facility (Accelerator, Scientific Instruments)

Scope includes also

- Integration of the new motion control with EPICS
- Robotics

# Motion platforms

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Motion controller – HW

- Temporary solution: DeltaTau GeoBrick
- Evaluating
  - DeltaTau Power PMAC
  - Beckhoff TwinCAT (different talk: EPICS – TwinCAT)
  - ESRF ICEPAP

# Summary

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ESS building has started for real

- Commissioning of the accelerator will start in 2 years

Control system effort is ramping up

- Moving to design decisions
- EPICS V4: pvAccess everywhere
- Come to Sweden ?
  Hiring people – (watch our web pages)

Motion control evaluation ongoing

- EPICS integration part of the evaluation

Need to bring EPICS to the Science Directorate in ESS, in kind partners

# Staff March 2015

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# Thank you

# Questions ?